

ICEFIELD RANGES RESEARCH PROJECT

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A Field Program of
THE ARCTIC INSTITUTE OF NORTH AMERICA
In Cooperation with
THE AMERICAN GEOGRAPHICAL SOCIETY

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Aims and Goals

The Icefield Ranges Research Project (IRRP) is a field program of the Arctic Institute of North America in cooperation with the American Geographical Society. Started in 1961, IRRP is an on-going program with a twofold concept: to study and describe a high mountain area in terms of its total environment and to provide field research opportunities and training for graduate and undergraduate students in association with senior investigators.

The immediate goal of IRRP is to increase man's knowledge and understanding of the ecology and environment of a high mountain region. The ultimate goal is to produce trained scientists who will use this knowledge to promote a better world for mankind.

One example of achieving an ultimate goal has resulted from the work of a team of U.S. and Canadian researchers led by Dr. Charles S. Houston of the University of Vermont College of Medicine. During each summer since 1966, this team has studied physiological problems that develop in persons rapidly exposed to high altitude. While performing studies in a laboratory on Mount Logan (at about 17,850 feet), Dr. Houston and his team observed retinal hemorrhages in 20 to 40 percent of their volunteer subjects. This ratio also occurs in newborn infants, and its cause was unknown until Dr. Houston attributed it to oxygen starvation.

Cover Photograph

Kaskawulsh Glacier looking south toward Mount Vancouver. Photograph taken from aircraft flying at 8000 feet.

The scientific reports are the dividends and the young scientists trained are the capital gains, of this very worthwhile project.

—Dr. G. Hattersley-Smith

IRRP is a multidisciplinary program that permits individual research within the framework of a total high mountain environmental study. Each year, selected students and teachers in Canada and the United States are encouraged to conduct field research in the Icefield Ranges study area.

Students carry out studies in any physical or biological field available within the Icefield Ranges. They may conduct short-term investigations to fulfill specific needs, or they may engage in some aspect of the long-range aim of the program: namely, to describe a high mountain region in terms of its interrelated physical and biological components, and to interpret these components as they affect the geography of both local and distant areas.

Each individual who participates in the IRRP program is encouraged to relate his particular study field to the total environment of the area. In this way, he gains a better understanding of the natural forces that interact to maintain and shape the destiny of a high mountain region.

Finally, each individual is encouraged to publish the results of his research, thereby adding to the fund of knowledge that has been accumulated about the Icefield Ranges research area.

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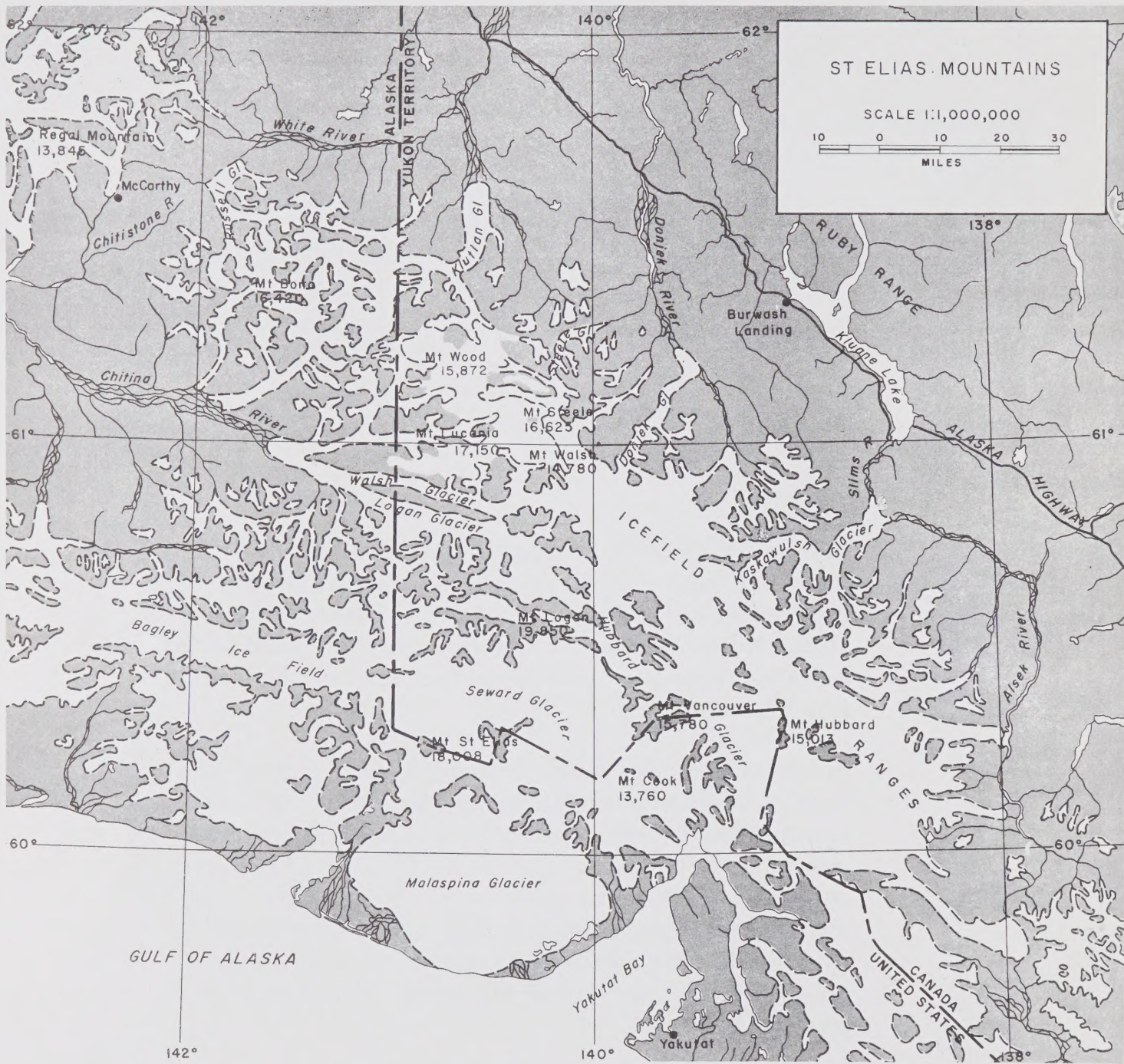
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Study Area

Vastness is a word that characterizes this great mountain landscape, and it applies no less to the glaciers than to the peaks themselves.

—Dr. Walter A. Wood

The St. Elias Mountains, located in southwest Yukon and adjacent Alaska, are among the highest coastal ranges in the world. This mountain system comprises several roughly parallel ranges that form a high barrier between the Gulf of Alaska and the Yukon Plateau less than 150 miles inland.

Dominating this region are Mount Logan at 19,850 feet, second highest mountain in North America, and Mount St. Elias at 18,008 feet. Also within this region, 13 peaks exceed 15,000 feet, scores surpass 12,000 feet, and hundreds crest at over 10,000 feet. The heart of this complex of mountains is the vast wilderness of high peaks and glaciers called the Icefield Ranges. Except for polar regions, this area radiates more glaciers than anywhere else in the world, with many of them flowing through valleys for more than 50 miles (the longest being Hubbard Glacier at over 70 miles).

This extensive mantle of snow and ice is maintained by a cold, wet climate. Precipitation along the coast commonly reaches 125 inches a year. Such heavy precipitation is not uniform for the entire mountain complex. By contrast, 110 miles inland at Kluane, the climate is cool but semiarid with yearly precipitation less than 15 inches.

IRRP interest focuses on a 10,000 square mile area astride the Alaska-Yukon border that extends from Yakutat on the south to White River on the north. Included are the Ruby Ranges to the east and McCarthy, Alaska to the west. Most research has been, and continues to be, conducted in this area at points that can be supported logistically.



Value of Program

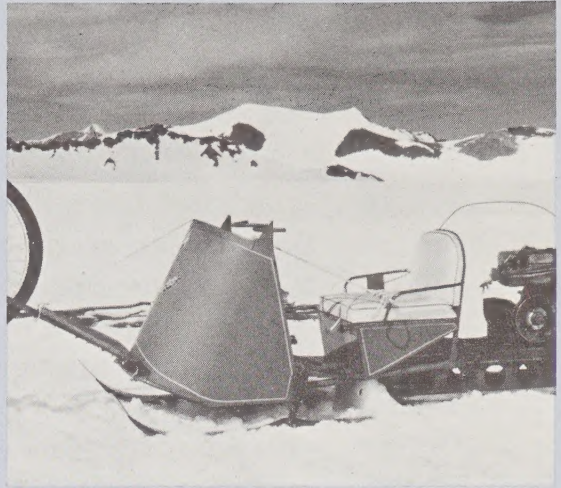
The Icefield Ranges dominate a glacierized alpine region which has been little disturbed by civilization. In fact, parts of the area have been scarcely explored except for topographic and mineral surveys. Thus, opportunities are almost unlimited for conducting studies in the physical and biological sciences in a virtually "pure" environment.

Glaciology has been a full-time area of study since IRRP's inception. Much of this study has focused on a highland glacier, an extensive snow basin from which flow in a star pattern five major glaciers. In recent years, interest has shifted to the Mount Steele watershed, an area noted for surging glaciers. Surging glaciers rampage at 2 or more feet per hour, often scouring valley walls many feet above the glacier's normal level. An intensive effort is underway to discover the forces that trigger these phenomena in hopes that mechanisms of glacier movement might become better known.

The Mount Logan physiological study is a long-term program that promises direct benefits for man. For example, how man adjusts or fails to adjust to oxygen starvation at high altitudes has relevance to the adjustment made by individuals suffering certain lung diseases and heart conditions in normal sea-level atmosphere. Part of this study is aimed at cataloging symptoms of oxygen starvation, some of which may be useful to doctors in recognizing the onset of certain medical problems.

Since one of IRRP's concepts is to provide field research training to students seeking advanced degrees, many projects are planned to fulfill individual student needs. These projects have included plant and animal studies, soil research, weather profiling, limnological studies, and geologic work around glacier termini and in drainage basins.

The real value of the IRRP program can best be appreciated by its results: to students (who have earned 15 PhD and 15 MA degrees through 1971); to science (three volumes of journal articles and theses have been published, with three more in preparation); and to special interest groups (detailed reports of government- and foundation-supported research).



Facilities

Most field research in the IRRP study area is carried out during summer months. However, Kluane Base Camp (see photograph) contains a permanent log cabin structure that can support year-round research. In addition to cooking and dining facilities, it contains sleeping quarters and laboratory space. (During the fall, winter, and spring months of 1970-1971, two graduate students lived and worked in the facility. One student continued a long-term study of Dall sheep; the other student conducted detailed climatologic and micrometeorologic studies.)

Much of the IRRP area is accessible only by foot or by aircraft. Therefore, camp logistics and field support are handled by aircraft operating from a 3000-foot runway at Kluane Base Camp. The Institute's STOL Helio Courier (H395) aircraft (see photograph), supercharged and ski-wheel equipped, delivers both personnel and supplies to field sites. The airplane is instrumented for all-weather flying, is provided with complete radio facilities, and is equipped for vertical and oblique photography.

Field stations (see photograph) are maintained in several places throughout the IRRP area. These stations consist of semipermanent structures that provide shelter and work space for field parties. Tent camps are set up for groups not near a field station.

Each field station and satellite group is supplied with radio equipment for communication with Kluane Base Camp, with the airplane if it is airborne, and with other stations. This network is vital in that requests for supplies, equipment, and emergency assistance can be responded to immediately. Local weather data are also passed over the network.

Mobility over snow and ice is aided by snowmobiles (see photograph). These vehicles expedite work by moving personnel and equipment quickly and reliably over a variety of snow and ice surfaces.

Operation

Operation of the IRRP program is supervised by Arctic Institute employees. Each summer a project director and one or two assistants administer program activities, most of which are planned many months ahead of time. Support personnel are normally part-time employees.

Scientific investigators working under specific contracts or grants are usually short-term Institute employees. While most student investigators and field assistants are supported by Institute grants, a few work voluntarily in the project for research experience and education.

Financial support for the IRRP program derives from various sources, including contracts and grants from government agencies, grants from foundations, and gifts from individuals. Operational costs of the program vary from year to year, depending largely on the program and the number of people working in the field.

Summer research begins in late May and ends in late August. Subsistence and project support for each participant in the program costs about \$2500 per season. Aircraft operation and maintenance, and replacement of worn-out equipment, field support gear, and vehicles are additional annual expenses.

Scientific groups are encouraged to conduct research in the area. The Institute makes available IRRP's facilities, including subsistence, housing, working space, aircraft use, and communications, to such groups on a cost-reimbursement basis. In addition, Kluane Base Camp facilities are ideal for seminars and workshops. They are especially suitable for educational or training programs for groups who wish to become familiar with alpine and glacier terrain.

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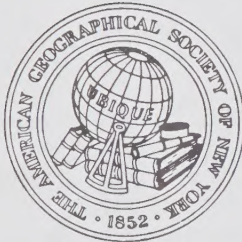
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